avoiding excessive concentration of licenses among a wide variety of applicants."[1] These stated goals are most likely to be met by aggregate license restrictions which result in a distribution of licenses among competitors of sufficient size to invest in innovative uses of spectrum but with a sufficiently large number of these competitors so that a variety of ideas and innovations are fostered and competitors can learn from the experiments of others.

A restriction on the number of pops is more likely to result in wide dissemination of licenses than a restriction on the number of licenses any bidder can win. Since there is enormous variation in the populations of BTAs and therefore in the value of BTA licenses, a restriction on the number of licenses is less effective than a restriction on the number of pops. Proposed restrictions on the number of licenses allow a single firm to obtain a very large fraction of the pops and value in the auction. One way to avoid this would be to tighten the restriction, but this could make it difficult for a bidder who focuses on small markets to reach a reasonable size in terms of customers served. The restriction to 98 licenses allows a single bidder to win over 180 million pops, which is 72% of the total available pops. In contrast, the 98 smallest licenses contain under 7 million pops or 3% of available pops.

The C-block auction reveals that there is reason to be concerned that a 98-license restriction may lead to a high degree of concentration in ownership. As of Round 90 in the C-block license, the 98 most expensive licenses cost a total of $11.3 billion. The 98 least expensive licenses cost $64 million which is 0.6% of the cost of the most expensive. The largest bidder, NextWave Telecom, Inc. is high bidder on 51 licenses accounting for 91 million pops which is 36% of the total. Its bid on these licenses exceeds $4 billion (net of 25% bidding credit) which is 41% of the total.

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1. 47 U.S.C. § 309(j)(3)(B).

A common measure which economists use to measure concentration is the Herfindahl-Hirschman Index (HHI). The HHI is simply the sum of the squares of market share multiplied by 10,000. The HHI of the C-block licenses measured in pops, as of round 90, is approximately 1600. The HHI measured by round 90 prices exceeds 2100. The Federal Trade Commission and the Antitrust Division of the Department of Justice's Merger Guidelines define an industry as being highly concentrated if its HHI exceeds 1800 and moderately concentrated if its HHI is between 1000 and 1800. By these measures, it is far from clear that excessive concentration has been avoided.[2]

A large fraction of the C-block licenses will not be owned by a small company because NextWave will become a very large company overnight if it is awarded the licenses it is currently high bidder on and it builds out its complete network. It will own $4 billion in licenses. Estimates of the capital expenditures needed to build out a network are on the order of $15/pop over the first five years for an additional $1.4 billion in required capitalization. In addition, a significant fraction of operating expenditures over the first few years will have to be financed while the customer base grows. Thus, NextWave will be a startup with $5-$7 billion in assets. This would place NextWave somewhere in the middle of Fortune 500 telecommunications companies in terms of assets. (Alltel is ranked 396 in the 1995 Fortune 500 and has $5.1 billion in assets and Comcast is ranked 369 and has $9.6 billion in assets). Large telecommunications companies such as Sprint and MCI had 1994 year end assets of $15.2 billion $19.3 billion respectively. If NextWave is successful in raising sufficient capital to fund its business, it will be a very large company.

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2. I do not claim that these calculations are indicative of the ability of license holders to exercise market power. I am simply using a common statistic for summarizing concentration to permit a better feel for the distribution of licenses in the C-Block auction.

A restriction on the aggregate number of pops can be more effective in preventing excessive concentration at the same time it permits a bidder to accumulate a significant presence in the market by focusing on BTAs with small populations. For example, in the C-block auction, the most expensive 50 million pops cost $4.2 billion while the least expensive 50 million pops cost $875 million. (I use 50 million pops because it represents 20% of the pops, just as 98 licenses represents 20% of the licenses). Thus the least one could spend and be constrained by the cap would be 21% of the most one could spend. If the Commission were to adopt AirLink's proposal of 27 million pops, this ratio would be 14%. In either case, it is apparent that an aggregate pop restriction places a more uniform restriction on the size of licensees than an aggregate license restriction and thereby does a better job of preventing excess concentration of licenses. Thus, with an aggregate pop restriction, the F.C.C. can prevent concentrated ownership in terms of pops or value without preventing bidders on small population BTAs from aggregating many licenses.

II. THE F.C.C. SHOULD REQUIRE LARGER DEPOSITS OR UPFRONT PAYMENTS

The structure of required payments in place for the C-block auction and the proposed structure for the F-block auctions reduce the financial burden on bidders in a way which may attract a wider variety of bidders. However, the structure may have some unintended consequences. It leads to a greater probability of significant number of defaults as well as incentives for speculative bidding. Both these effects can inefficiently delay the deployment of services from the licenses. It may be possible to achieve the same financial subsidy and reduce the likelihood of these negative consequences.

The current structure is motivated by the realization that one of the most significant constraints an entrepreneurial company faces is to attract capital at reasonable rates. The government furthers the goals of competition and diversity by providing access to capital at rates below that which bidders would have to pay in the market. However, the government should try to do this in a way which minimizes the incentives to use licenses inefficiently.

Low deposits, low upfront payments, and favorable credit terms for the remainder of the license fees achieves these subsidies but it can have some unintended consequences. The low early payments can encourage bidders with insufficient sources of capital or poor business strategies to participate under the false hope of attracting more capital after being awarded licenses. Defaults are costly to consumers because they result in re-auctions and delay the provision of services.

A system whereby greater payments must be made sooner would force bidders to line up more financing prior to or during the auction. This would help weed out bad managers and bad business plans and thereby reduce the likelihood of default. Financial economists have analyzed the important role which external capital markets play in providing discipline to managers. The F.C.C. should be careful that it does not eliminate the important role that these markets can play.

The risk of significant defaults in the C block auction may be quite real. Prices (net of the 25% bidding credit) are more than 2.5 times the prices for the A and B block auction. This is despite the head start that the earlier licensees have and the greater flexibility in transferring their licenses. The recent sales of Denver and Atlanta MTA licenses at prices similar to their auction price does not give support to a theory based on changes in values over the past year or limited competition in the MTA auction.

A second problem which could arise under the proposed structure is bidding exclusively for the option value of a license. Uncertainty about demand and competition for PCS services creates significant uncertainty about the future value of PCS licenses. The wide discrepancy of estimates of revenue from these auctions is evidence of this. Large uncertainty coupled with low upfront payments means that the best financial return from a license may be to make the low upfront payments, but not build out a network or develop a business immediately. Instead the licensee may choose to wait, default if values go down and build a network only if market values rise.

A numerical example may help. Suppose there is an 80% probability that a license is worth $10 and a 20% probability that it is worth $100. The expected value of the license is $18. Assume that if the licensee waits a year to build out the network, values will be 10% lower (i.e., $9 or $90) but the uncertainty will be resolved. If upfront payments are 16% (10% downpayment and approximate annual interest of 6%) within the first year and the F.C.C. has no recourse beyond repossessing the license, a bidder will be willing to bid up to $50 for the license. A bid of $50 costs $8 in the first year (.16*50). There is an 80% probability of default and a 20% probability that the licensee will earn $40 (90-50). The expected profits from the bid is .2(40) - 8 = 0. If the bidder was required to make greater upfront payments, the inefficient waiting to build out can be deterred.

I have not done analysis of the distribution of license values to know how great a risk there is that bidders will find it attractive to follow this wait-and-see strategy with default as a real option. The risk is probably greater in the F-block auction than any other because the value of an incremental 10-MHz license may be very sensitive to the realization of uncertainty about demand and competition over the next few years.

There are several ways to preserve favorable financing for the F-block bidders while reducing the risks of early default and buying licenses for option value. The way to do this is to have larger payments early, either by way of larger deposits or initial payments. The cost of this to the bidders can be offset through more attractive financing terms for the remainder of the payments. This can be accomplished by spreading out the remaining payments over a greater number of years or by charging lower interest rates over that period. A change in this direction can create the same incentives to attract serious entrepreneurial bidders while minimizing inefficiencies associated with defaults.

CONCLUSIONS

The F.C.C. can better achieve its goals for the F-block auction of competition and diversity of ownership with two types of rule changes. First, an aggregate pop restriction does a better job than an aggregate license restriction in preventing excessive concentration without putting undue restrictions on bidders focusing on small markets. Second, a restructuring of the timing of payments towards larger deposits and downpayments can reduce the probability of defaults and inefficient speculative bidding. The overall subsidy can be maintained by extending later payments or a reduction in interest rates.

QUALIFICATIONS

I am Professor of Economics and Strategy at the Graduate School of Business of The University of Chicago. I received an A.B. in Economics from Princeton University in 1981 and a Ph.D. in Economics from the Massachusetts Institute of Technology in 1986. I am also a Research Fellow at the National Bureau of Economic Research. I specialize in the economics of industrial organization (the study of individual markets which includes the study of antitrust and regulation), game theory (the formal study of strategic interdependence), and law and economics (applications of economics to legal issues). I am co-author of Game Theory and the Law, a book which applies the modern tools of game theory and information economics to legal issues. I have published numerous articles in academic journals. I am Co-Editor of the Journal of Business, a leading journal which publishes academic research applying economics to business problems and Associate Editor of the Journal of Industrial Economics.

In addition to my academic experience, I advised Sprint on auction design issues, WirelessCo. on bidding strategies in the A&B Block PCS auction, and AirLink, L.L.C. on bidding strategies in the C Block PCS auction. I have an association with Lexecon Inc., an economics consulting firm which specializes in the application of economic analysis to legal and regulatory issues. I have worked on numerous antitrust and regulatory matters in this capacity.

A copy of my curriculum vitae is attached.

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ACADEMIC PUBLICATIONS

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